

APS WK#4: Materials Discovery with Grazing-incidence X-ray Photon Correlation Spectroscopy: Opportunities and Challenges

Organizers: Joseph Strzalka, Zhang Jiang, and Jin Wang

X-ray Photon Correlation Spectroscopy (XPCS) has become established in the 21st century as a critical tool for investigating dynamics in bulk systems. In this time, pioneering work has applied XPCS to surfaces and interfaces in a grazing incidence (GI) geometry. Now, with the advent of next generation synchrotron sources like the APS-U, GI-XPCS is poised to break through from unusual experiment to more routine application. Facilities like the new APS-U beamline 9ID promise to make GI-XPCS as accessible as GISAXS/GIWAXS. This will bring new and impactful insights into the dynamics of thin film materials in such vital areas as renewable energy, advanced microelectronics and the manufacturing techniques needed to bring these materials from lab to fab. In particular, the brilliance of new sources like APS-U will enable operando studies of devices and deposition processes, revealing the evolution of dynamics under a range of conditions. Scientific progress will require concomitant progress in the development of GI-XPCS to address challenges in the collection and processing of experimental data, as well as in the interpretation of results. This workshop is an opportunity to chart the course ahead, identify areas most in need of development, and steer the field along the most promising avenues of research.